

WHAT IS CLAIMED IS:

1. A transmission control device for a terminal apparatus, comprising:

a transmission buffer for temporarily storing continuously generated status data;

5 a dedicated buffer for temporarily storing at least the most recent status data and a history data when said transmission buffer is not empty;

a history data generating unit for generating said history data to indicate a change in the most recent status data transferred to said dedicated buffer; and

10 a control unit for controlling the storing to said dedicated buffer of the most recently transferred status data when said transmission buffer is not empty, and for responding to said transmission buffer ceasing to be full by producing a history-summary data using at least said history data and transferring the status data stored in said dedicated buffer and said history-summary data to said transmission buffer, and for transmitting the status data and history-summary data stored in
15 said transmission buffer.

2. The transmission control device of claim 1, wherein said history data indicates state changes from a not-actuated state to an actuated state in any status bit in the status data transferred to said dedicated buffer.

20 3. The transmission control device of claim 2, wherein said history data is generated by producing the bit-wise exclusive OR combination of the current contents of said dedicated buffer with the most recent status data transferred to said dedicated buffer, and applying the result to a bit-wise logical OR combination with the current value of said history data, the result of said bit-wise logical OR being assigned as the new values of said history data.

25 4. The transmission control device of claim 1, wherein said history-summary data is produced using a logical combination of said history data and the status data stored in said dedicated buffer.

5. The transmission control device of claim 4, wherein the most recently transferred status data is stored into said dedicated buffer by said control unit after said history data generating unit generating said history data in response to the most recently transferred status data.

5 6. The transmission control device of claim 4, wherein said logical combination is the exclusive OR combination of said history data and the status data stored in said dedicated buffer.

10 7. The transmission control device of claim 1, wherein said control unit transfers the status data stored in said dedicated buffer and said history-summary data to said transmission buffer for successive transmission one after the other.

8. The transmission control device of claim 1, wherein said dedicated buffer is a FIFO-type buffer, and wherein said history data generating unit and at least part of said control unit are collectively identified as a merge-circuit;

15 said dedicated buffer successively storing newly transferred status data in FIFO order without processing of the newly transferred status data by said merge circuit until said dedicated buffer is full;

said merge circuit being actuated to process the most recent status data transferred to said dedicated buffer in response to said dedicated buffer becoming full.

20 9. The transmission control device of claim 8, wherein said control unit transfers said history-summary data to said transmission via said dedicated buffer, said dedicated buffer being effective for transferring said history-summary data to said transmission buffer in FIFO order.

25 10. A transmission control device for a terminal apparatus as described in claim 1, wherein said dedicated buffer includes a first-in, first-out (FIFO) type buffer and a separate memory space;

said FIFO-type buffer having a plurality of storage stages and being effective for storing the status data sent to said dedicated buffer when said transmission buffer is full until said FIFO-type buffer itself becomes full;

5 said separate memory being effective for storing said history data and for storing the status data sent to said dedicated buffer when both said transmission buffer and said FIFO-type buffer are full;

said history data generating unit generating said history data based on the most recent status data transferred to said dedicated buffer and the current status data stored in said separate memory space; and

10 said control unit transferring status data from said FIFO-type buffer to said transmission buffer in FIFO order when no history data is stored in said second memory space.

11. The transmission control device of claim 10, wherein status data and history summary data is transferred from said second memory space to said transmission buffer via said FIFO-type buffer in FIFO order.

12. A transmission control device for a terminal apparatus as described in claim 1, wherein the status data stored in said dedicated buffer and for which history data is generated by said history data generating unit consists of specific predetermined status data types.

20 13. A transmission control device for a terminal apparatus as described in claim 1, wherein:

each data bit of the status data identifies a different status condition; and

the generating of history data by said history data generating unit includes sequentially calculating the bitwise logical OR combination of identified bit status changes in the newly received status data with the current history data.

14. A transmission control device for a terminal apparatus as described in claim 1, further comprising:

a history data storage unit for storing said history data; and

wherein said control unit further controls the storing of said history data to said history data storage unit, whereby said history data is not stored in said dedicated buffer.

- 5 15. A transmission control device for a terminal apparatus as described in claim 1, wherein said dedicated buffer includes a first dedicated sub-buffer and a second dedicated sub-buffer; said first dedicated sub-buffer being of a first-in, first-out (FIFO) type and being effective for storing the status data sent to said dedicated buffer when said transmission buffer is full, said FIFO-type first dedicated sub-
10 buffer having a plurality of storage stages and being effective for overwriting its last storage stage with newly received status data when all of its previous storage stages are full;

said second dedicated sub-buffer being effective for storing said history data;

- 15 said history data generating unit generating said history data based on the most recent status data transferred to the last storage stage of said first dedicated sub-buffer and the current contents of the last stage of said first dedicated sub-buffer; and

- 20 said control unit transferring status data from said first dedicated sub-buffer and history data from said second dedicated sub-buffer to said transmission buffer when the history data is stored in said second dedicated sub-buffer, and transferring status data in first-in, first-out order from said first dedicated sub-buffer to said transmission buffer when history data is not stored in said second dedicated sub-buffer.

- 25 16. A transmission control method for a terminal device having a transmission buffer and a transmission control unit, comprising the following steps:

(a) determining if the transmission buffer is full, and storing continuously generated status data to the transmission buffer if the transmission buffer is not full;

(b) generating, when the transmission buffer is full, history data indicating a summary of changes in successively received status data that could not be stored in the full transmission buffer;

(c) storing at least the most recently received status data and said history
5 data; and

(d) transferring the stored, most recently received status data and said history data to the transmission buffer when the transmission buffer ceases to be full.

17. A transmission control method for a terminal device as described in claim 16, wherein the received status data processed in step (b), step (c), and step (d) includes
10 predetermined status data types.

18. A transmission control method for a terminal device as described in claim 16 , wherein each data bit of the received status data processed in step (b), step (c), and step (d) identifies a different status condition; and

step (b) includes the sequential calculating of a bitwise logical OR of
15 identified bit status changes in the newly received status data with Mid data showing which bits had previously changed status and which had not.

19. A transmission control method for a terminal device having a transmission buffer and a transmission control unit, comprising the following steps:

20 (a) determining if the transmission buffer is full, and storing continuously generated status data into the transmission buffer if the transmission buffer is not full;

(b) storing newly received status data to a first dedicated buffer of a first-in, first-out (FIFO) type when the transmission buffer is full;

25 (c) generating history data indicating a summary of status changes in newly receive status data as compared to status data output from a last stage of the first dedicated buffer;

(d) storing in a second dedicated buffer at least said history data and the most recent status data output from the last stage of the first dedicated buffer; and

(e) transferring the status data and history data from said second dedicated buffer to said transmission buffer when status data and history data are stored in said second dedicated buffer, and transferring status data in first-in, first-out order from said first dedicated buffer to said transmission buffer when no status data is not stored in said second dedicated buffer.

20. A transmission control method for a terminal device as described in claim 19, wherein the status data processed in step (b), step (c), step (d), and step (e) consists of specific predetermined status data types.

21. A transmission control method for a terminal device as described in claim 19, wherein each data bit of the status data processed in step (b), step (c), step (d), and step (e) identifies a different status condition; and

step (c) includes the sequential calculation of a bitwise logical OR of identified bit status changes in the newly received status data with Mid data showing which bits had previously changed status and which had not.

22. A computer-readable data storage medium for storing a computer program achieving the steps of the transmission control method described in claim 16.

23. A data storage medium as described in claim 22, wherein said data storage medium is one of a Compact Disc, a floppy disk, a hard disk, and a magnetic tape.

24. A computing device configured to achieving the steps of the transmission control method described in claim 16.

25. A printer having an auto status back, ASB, function to generate status data, wherein said printer further generates change data that indicates status changes between earlier status data previously sent to a host device and current status data

generated by said ASB function, wherein said change data is transmitted when said current status data is transmitted to said host device.

26. A printer having an auto status back, ASB, function to generate status data, said printer comprising:

5 a first memory for storing a first status data previously transmitted to a host device;

 a second memory for storing a second status data currently generated by said ASB function;

 a calculation unit for producing change data showing status changes
10 between said first status data and said second status data;

 a transmission device for transmitting said second status data and said change data.

27. A data transmission method for a printing device having an auto status back, ASB, function, said method comprising:

15 generating change data indicating status changes between earlier status data previously sent to a host device and current status data generated by said ASB function; and

 transmitting said change data when said current status data is transmitted to said host device.